The claimed invention is:

1. A method of compensating for losses in a tunable laser filter that includes a waveguide formed from tunable material and an amplifying material disposed in a parallel relationship with the tunable material, the tuning and amplifying materials having different compositions, the method comprising:

injecting charge carriers into the tunable material and amplifying material simultaneously so that the amplifying material provides gain to light propagating along the tunable material waveguide and so that the refractive index of the tunable material is changed to a desired value.

2. A method as recited in claim 1, further comprising disposing the amplifying material in repeated discrete sections so that a distance between at least some parts of the tunable material and the amplifying material is greater than a charge carrier diffusion length.

3. A method as recited in claim 1, further comprising placing the tuning material at an average distance from the amplifying material that is greater than the diffusion length of the charge carriers.

4. A method as recited in claim 1, further comprising disposing repeated lengths of amplifying material along a direction parallel to the waveguide.

5. A method as recited in claim 1, wherein the filter includes a grating structure formed of sections of grating material regularly spaced along the waveguide, and further comprising disposing the amplifying material as sections beside respective sections of grating material, the sections of amplifying material having substantially a same extent as the respective sections of the grating material.

6. A method as recited in claim 1, wherein the amplifying material has a photoluminescence wavelength of about 1.55 μm.

7. A method as recited in claim 1, wherein the filter is a frequency-selective reflector having a peak reflectivity at approximately about $\lambda = 1.55\ \mu m$.

8. A method as recited in claim 6, wherein the amplifying material is $In_{(1-X)}Ga_XAs_YP_{(1-Y)}$.

9. A tunable laser filter, comprising

a tunable waveguide formed from a tuning material; and

an amplifying material having a composition different from the composition of the tuning material, the amplifying material disposed in a parallel relationship with the tunable waveguide so as to amplify light propagating along the tunable waveguide.

10. A filter as recited in claim 9, wherein the amplifying material is disposed in repeated, discrete sections parallel to the tunable waveguide and portions of the tuning material are separated from the discrete sections of the amplifying material by a distance greater than a charge carrier diffusion length.

11. A filter as recited in claim 9, wherein the tuning material is disposed at an average distance from the amplifying material that is greater than the diffusion length of the charge carriers.

12. A filter as recited in claim 9, wherein the amplifying material is disposed proximate the tunable waveguide as repeated lengths of amplifying material parallel to the tunable waveguide.

13. A filter as recited in claim 9, further comprising a grating structure formed of sections of grating material regularly spaced along the tunable waveguide, the amplifying material being disposed as sections beside respective sections of grating material, the sections of amplifying material having substantially a same extent as the respective sections of the grating material.

14. A filter as recited in claim 9, wherein the amplifying material has a photoluminescence wavelength of about 1.55 μm.

15. A filter as recited in claim 9, wherein the filter is a frequency-selective reflector having a peak reflectivity at approximately about λ = 1.55 μm.

16. A filter as recited in claim 15, wherein the amplifying material is $In_{(1-X)}Ga_XAs_YP_{(1-Y)}$.

17. A filter as recited in claim 9, further comprising a second waveguide proximate the tunable waveguide so that light couples between the tunable and second waveguides.

18. A filter as recited in claim 17, further comprising a grating structure disposed proximate the tunable waveguide to frequency select the light coupled between the tunable waveguide and the second waveguide.

19. A filter as recited in claim 9, wherein the tuning material has a bandgap energy higher than the photon energy of the light propagating along tunable waveguide.

20. A filter as recited in claim 19, wherein the amplifying material has a band gap energy approximately the same as the photon energy of the light propagating along the tunable waveguide.